calculated values for the parameters are sent to respective transmission equipment (step 120), and the communications channel is established (step 104). The difference between the incumbent parameter values and the calculated parameter values is the adjustment factor for the parameter measures.

**[0050]** If it is determined by the C-BRV module 55 in step 114 that network equipment required to support a wavelength for the communications channel is not available, or, if in step 118, one of the wavelength(s) is determined not to be viable, in step 122 it is determined whether another wavelength(s) on the same route is available. If another wavelength(s) is available, the C-BRV module 55 continues at step 110. If the resource availability information indicates that no other wavelength(s) are available, a message is passed back to the WRM module 54, which determines if there is another route to try (step 124). If there is an untried route in the routing table, the WRM module 54 returns to step 108, otherwise the WRM module reports back to service management module 50 that capacity is not available (step 126) to serve the service request. The method of selecting wavelengths and routes is further discussed below with reference to FIG. 4.

**[0051]** FIG. 4 illustrates an embodiment of a wavelength selection algorithm used by the WRM module 54 in accordance with the invention. In step 200, the WRM module 54 receives a request for capacity on a given route (between network elements A and B). The WRM module 54 computes a number, if any, of regenerations required to span the given route, using at least one rule abstracted from propagation constraints in the optical network. This rule may be a simple one based on distance, or number of spans, or a more

complex calculation. If the WRM module 54 determines that no regeneration is required (in step 202), the route between A and B is sectioned into individual links (step 204). An intersection of the available wavelengths on each of the sectioned links is a set of wavelengths available between A and B. If the set is not an empty set (as determined in step 208), one of the wavelengths in the set is selected according to one or more secondary criteria, in step 210, and, in step 212, the selected wavelength and route are passed to the C-BRV 55. If the intersection is determined to be empty (step 208) the WRM 54 determines whether to attempt to select wavelengths for a communications channel that requires one regeneration (regen) (step 214). If it is determined that a selection with regeneration cannot or should not be evaluated, the WRM module 54 informs the route selection algorithm that the selected route is unavailable (step 216), and another route is selected or the service request is denied, as described above.

**[0052]** If in step 202, the WRM module 54 determines that regeneration is required, a variable N is set to 1, and another variable R is set to the number of regens deemed required (step 218). Similarly, if, in step 214, it is determined that the route should be tried again with one regeneration, N is set to 1, and R is set to 1 (step 220). In step 222, the route is parsed into R+1 consecutive regen spans, the parsing being dictated by a regen set, which is a set of R network elements that are adapted, and according to regeneration availability information, available to regenerate the wavelength(s) for the communications channel. All available regen sets are selected or generated. Each regen span in each regen set is numbered

by an order defined by the route, preferably starting with 1.

**[0053]** If no regen set exists, at step 224, a message indicating that the route is not available, is sent to the route selection algorithm (step 228). If a regen set exists (as determined in step 224), one of the regen set(s) is selected (step 230). A regen span numbered N is sectioned into links, in step 232, and the intersection of wavelengths available on all of the sectioned links is determined in step 234 using wavelength availability information. If the intersection is empty (as determined in step 236), a memory containing selected wavelengths is cleared (step 237), N is reset to 1 (step 238), the regen set is deleted (step 239), and the WRM module 54 returns to step 224. Otherwise a wavelength is selected for the regen span (step 240). As is shown in the art, the wavelength selection may be randomized in order to prevent two capacity requests in the same cycle from causing recurring conflict if the capacity requests are processed in parallel. Thus the selection conforms with a back-off algorithm. If N is less than R+1 (as determined in step 242), a regen span that has not been assigned a wavelength exists. The variable N is therefore incremented by one (step 244), and the WRM module 54 returns to step 232. If N is equal to R+1, a wavelength(s) has been selected for each of the regen spans, and the route and wavelengths are sent by the WRM module 54 to the C-BRV (step 246).

**[0054]** After a communications channel has been selected and determined to be viable, the channel is brought into service by the WRM 54, which also notifies the capacity